

HOT IRON #130: August, 2025

THE JOURNAL OF THE CONSTRUCTOR'S CLUB

Technical Editor: Please send technical questions and suggestions [to Peter, G6NGR](#)

Content and Distribution: Send ideas for content or subscriptions [to Frank, W4NPN](#)

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Our wonderful hobby includes those with a great deal of electronic knowledge as well as those just beginning their journey. Some prefer digital modes and projects, others prefer analog projects and devices that glow in the dark. Our quarterly newsletter, begun by [G3PCJ of Walford Electronics](#), tries to publish something for each, while trying to keep the focus on construction of various devices!

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Special Notices:

- 1) Publishing this 31 August issue has been delayed due to an urgent need to go to Florida on short notice, because of a family medical emergency there - Frank (W4NPN). The next quarterly issue will be published at the end of November.
- 2) I have been forced to temporarily remove the website's *Hot Iron* subscription form because it is being flooded every day with a high volume of Russian SPAM attacks. Therefore, to be added to the Hot Iron subscribers list, send an email to me at fbw4nnpn@gmail.com, requesting addition. Make the subject field say "**Hot Iron Subscription.**" Share us with your friends!

Miscellaneous News Items:

- * [Who's There?](#) **U.S. hams have access to an internet service** that will list all hams in their zip code. Frank was amazed to find over 100 in his modest-size city (~50,000). It is provided by RadioQTH.net.
- * **Zero Retries** has compiled an informative [Directory of Independent Open Amateur Radio Technical Media](#). There are many listings of interest here. [Zero Retries #0203](#) has a good article about attending Hamvention. [#0202 mentions the potential](#) to apply AI to the DLARC library...what a resource that would be!
- * If you haven't visited the [Internet Archive](#), do so soon! It contains a huge DLARC library – just enter DLARC in the website's search box and you can find copies of almost all ham radio magazines. [Amateur Radio Weekly #365](#) contains a link to [Zero Retries #184](#) where Kay Savetz, K6KJN, has an

informative write-up that lists some of the additions made to the Internet Archive DLARC library. Check it out!

* **[Great News about Sunspot Cycles:](#)** Solar Cycle 26 (which peaks in 2036) is expected to be better than the present cycle #25, and future ones may even be stronger. Read about the 100-year Gleissberg sunspot cycle at the link above. [Amateur Radio Weekly](#) has reported this information to us.

* **[Random Wire Review #133](#)** talks about the importance of the internet in ham connectivity.

* **[Zero Retries #0205](#)** has an encouraging article by KC9XG, about Raspberry Pi 5's improved capabilities. Also, the various issues continue to produce articles about Meshtastic technology – check it out!

* Curious about “Number Stations” (a.k.a. Spy Stations)? [Priyam lists these frequencies](#) and to which parts of the globe the transmissions are aimed.

* **Ken, W7EKB**, reminds us that, if you frequently bid for items on eBay, [Auction Sniper](#) might help you win those bids.

* When Frank worked in Saudi Arabia, the Saudis he worked with were well aware of what we call “Murphy’s Law.” They even had a corollary to it (Omar’s Law), which stated that “Murphy was an optimist.” Along those lines, [Nuts and Volts Magazine presents “The Second Law of Dropped Screw Dynamics.”](#) And much more! It’s a good read and most of us can sympathize with it.

PROJECT SECTION:

* Safety, Safety, Safety: [This Nuts and Volts article provides a good recap of safe practices](#); yes, we have heard many of these before, but a quick review couldn’t hurt, would it?

* When restoring a piece of gear, we often wonder if a capacitor should be replaced. [This link can provide answers to that question.](#)

* [Elektor Magazine has 51 pages of projects](#); over 500 in total, to keep you busy this fall and the coming cold winter.

* **[The Nuts & Volts](#)** E-magazine has an article about a simple 250 watt dummy load using microwave dummy loads which are cheaply available on the internet. We’ve mentioned this technique before in Hot Iron and W4NPN confirms that these work quite well; even incorporating a switch-selected one into a homebrew antenna tuner, and using the tuner’s chassis as the heatsink. Simple!

* When designing an RF front-end bandspread for a receiver, to cover a specific frequency range, we need to know the values of the padder and trimmer capacitors, and the inductor. The *Bandspread Component Calculator*, found on the [website’s Construction page](#), will calculate those for you.

* **Random Wire #143** discusses building an AllStar node using a Raspberry Pi 4 and an Argon ONE case.

- * **Ham Radio Outside the Box** has a good article about a field-deployable antenna. There's much more to read, including an article on Delta Loop antennas. Give it a try.
- * The latest **Nuts and Volts magazine** has an article about using an NPN transistor as a switch. Lots to learn there! **Here's the link to the main site**, which contains an article about the Discovery of Radio Waves, for those who like a bit of history.
- * VE3VN has an article about **building a Delta Loop for 30 meters**; it contains a lot of tips for the mechanical construction of the antenna. You can also read his other blogs which are listed on the right side of the page containing this article. There is also a good Gray Line propagation article in the same blog issue. **Also, try this Antenna web page**.
- * How about **Elector Mag's Coil-less Synchrodyne Receiver for LW and MW?** This old but sensitive design deserves a good read.
- * Buck and Boost Transformers: Frank just acquired a ~70 year-old Hammarlund HQ-140XA Receiver in very good condition, and which he likes very much. It was designed to run on 110-115 VAC and the voltage at his shack is 120-121 VAC. To treat it gently, he would like to reduce the voltage without using a Variac. After speaking to others, he has found that this well-known old-tech is a lost art, so **this link provides a good article about using junkbox transformers to buck or boost the supply voltage**.
- * The Hammarlund HQ-140XA (single conversion), and many other receivers of its generation, is not particularly sensitive above 20 meters. It is nearly the last of the Hammarlund single-conversion receiver product line (HQ-150 is the last). **This KD6RF article discusses adding a solid state amp** to the IF chain to help overcome this in an HQ-145 (dual conversion) and this might also work on the HQ-140X. If any reader has ideas about improving the HQ-140X lack of higher-frequency sensitivity, please share them with W4NPN at **fbw4npn@gmail.com**.

* ChatGPT: Just for fun, we asked ChatGPT for a compendium of articles about using the venerable 807 tube as an HF transmitter. It compiled an impressive list which has been added as a downloadable **Word doc. at the end of the left column of the website Resources page**. Try it for 6L6 or 6146B tubes, etc. What ChatGPT can do is truly amazing.

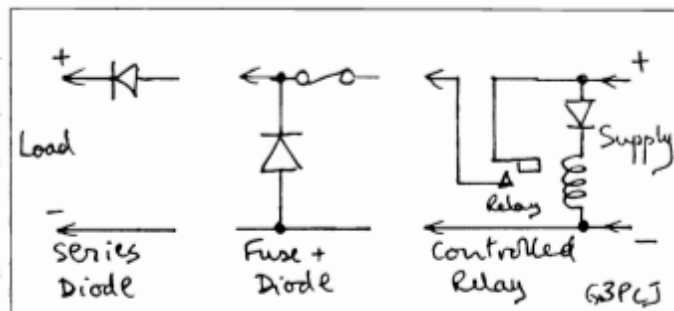
Hot Iron Articles Worth Reprinting:

From Hot Iron #13, Autumn 1996 – written in the last century by G3PCJ, but still valid!

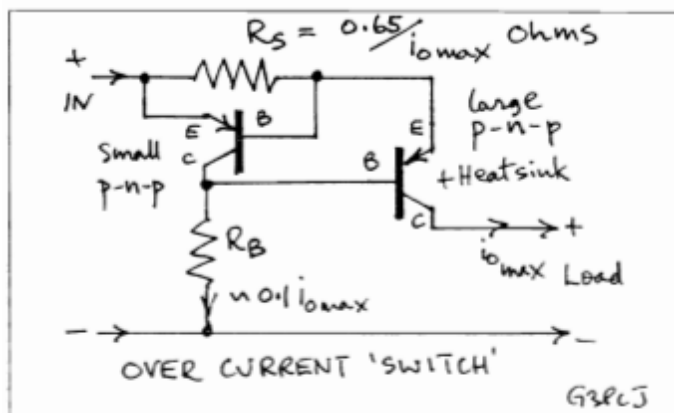
Power Supply Protection: One of our members recently had a cheap CB type commercial PSU fail, resulting in high DC volts on his Taunton plus counter, which burnt out some of the chips supplied direct from the 12 volt line. Hence these notes! These are not complete circuits

since you may be able to use what is already in your junk box. It is necessary to keep protection circuits simple so that their reliability will be appreciably higher than the item which might fail, causing damage. However simple circuits often have poorly defined operating points so it is vital to try them out with care on dummy loads first! **Reverse polarity** - protects against operator failure! The easiest is a series watty diode, better is a series fuse followed by watty diode across the supply. Note that a correctly connected RF output stage FET such as an IRF510 acts just like this power diode (assuming its drain is always connected to the supply). This has saved my Yeovil once with the supply wires acting as fuse! Even better still is a relay with a diode in series with the coil

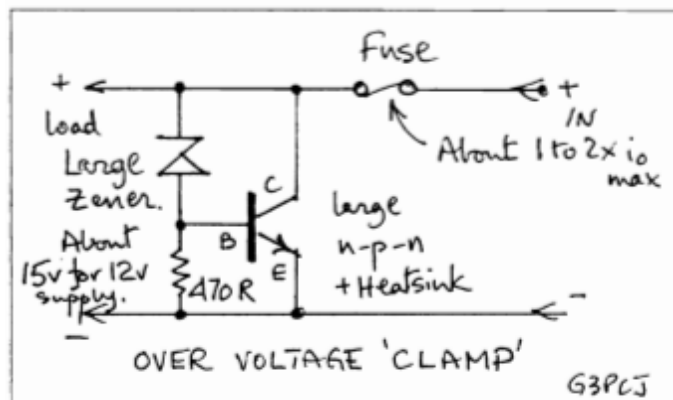
– see below:



Over-current sensing - protects against load failure! The load current is sensed and, when above some threshold, shuts down the regulator by removing the control voltage. Most schemes depend on the load current flowing through a resistor which turns on a transistor, hence there is nearly always a voltage drop of about 0.7 volts. The 'switch' scheme outlined right can be added to an existing supply but will have a variable loss across it up to about 1 volt. This can be avoided if it is placed in the raw DC line feeding the regulator. The current through R needs to be about 10% of I_{max} . - also consider R_n dissipation. The sense resistor should be about 0.65 volts divided by I_{max} . Use a watty transistor + heatsink for the output.



Over-voltage sensing - protects against PSU failure! Here a fast acting circuit is needed to avoid damage to the load. Usually the excessive voltage triggers a 'crow-bar' across the supply - often done with an SCR which stays on till the PSU is shut down. The scheme below is a compromise between simplicity and precise trip voltage. Again use a watty transistor with heatsink and also a relatively watty zener. Don't forget the fuse or you may loose the protection devices as well! It is well worth trying this out first with a variable power supply to assess the actual voltage at which the transistor turns on hard.



Yet another case recently of inadequate metalwork acting as heatsink in a PSU; this time with a LM317T regulator which warmed up after a few minutes and began to shutdown by reducing the supply voltage. The consequence was a slow change in VFO frequency as the PSU warmed up. If the regulating device feels hot to touch add more metal! It may be able to handle a high current but only if it is kept cool! G3PCJ

Antenna Stuff:

* End Fed Antennas of various types continue to be a “hot” subject in many amateur publications. [A compendium of EFHW antennas can be found on the website’s “Antenna” page.](#) Scroll down just a bit to find the link to the compendium.

* [VA3KOT details his saga related to buying and installing a spiderbeam.](#)

Home-built Test Equipment:

* A workbench deserves a utility DC power supply, if you are to build or service devices needing B+ and Filament voltages. [The design illustrated at this link](#) illustrates a very simple and inexpensive way to provide about 750 and 375 VDC, as well as 6.3-0-6.3 filament voltages. The components

illustrated are what was available in the junk box and you can use what you have and still make it work. Your output voltages might be different – they depend on the transformer used.

*** A low power solid state audio amp using the venerable LM386 is one of the selections found at [this link](#). A higher power one can also be found there. You need one for your shop work!**

*** If you want a simple 12AX7-6L6 tube audio amp for the workbench, [a simple design can be found here](#). Look in the right-most column for “Simple Tube Audio Amplifier.” If you want to add more tone control circuitry, [use this link and scroll down to see Bob Heil’s \(K9EID, SK\) tone control circuit](#).**

*** If you need a quick, low wattage audio amp to drive headphones or a very small loudspeaker, for workbench use, a tube design is desired, and no output transformer is available, try an [“Output TransformerLess” design, which uses a 6AS7/6080 tube in a cathode follower configuration](#).**

*** Looking for a short circuit? A unique technique from Peter:**

On modern PCB’s a “shorted” component, usually a ‘chip’ capacitor or one of its brethren strung between the supply rails as decouplers, are the very Devil to isolate. So, how to progress?

A constant current source is your friend: fabricated using a common 7805 regulator, a constant current source can be used to find shorts in a “four point probe” rig, powered from a 12v PSU.

Search for ‘constant current source using a 7805 schematic’ using your favourite internet search engine and you’ll find hundreds. Don’t neglect decoupling capacitors, these circuits can go unstable if the circuits you’re testing feature inductors – common nowadays. Aim for an output below an Amp or so (i.e. sense resistor, output to common, leg etc; 5 ohms); but go easy: those wafer thin PCB tracks ‘do not like it up ‘em’ !

Keeping the voltage on the probes low lessens the possibility of damaging ‘good’ components in parallel with the “short”. Shunt your constant current output with a (3 Amp forward current rated) silicon diode in series; this clamps the output volts to ~ 0.7 volts, a safe value for most jobs. I attached my diode on the output from the constant current source, the leads to the probes are non-critical length and don’t affect measurements. You’ll definitely need to heatsink the 7805 as it’s doing some real ‘heavy lifting’ for you!

The four point rig is made sliding two brass ‘liners’ from a choc-bloc strip onto your multimeter probes. I soldered the constant current output leads to the brass liners – this makes life easier! The probes then touch onto the positive and negative supply PCB

tracks, and note the voltage reading for each position: you're looking for the minimum to indicate the short is close by.

You'll need to pierce the conformal coating over the tracks. The actual value in milli-ohms isn't important, you're looking for that minimum value point. More Amps from the constant current source = higher milli-volt readings; I found ½ Amp (i.e. a 10 ohm resistor) in the constant current generator worked fine.

The theory: driving current into a "short," whilst measuring the volt drop, the minimum value indicated tells you you're close to the short. Even the "shortest short" has resistance; as the probes near the "short," the indicated voltage drops, as the 'short' resistance is milli-ohms. Away from the "short," the indicated voltage rises. Try it on some strip board with a deliberate "short" to get the feel of the job.

In our next issue (end of November), we will try to focus on troubleshooting!

Ham Radio Clubs and Organizations:

[Burnley & District Amateur Radio Club - MX0STB](#) This club, in Lancashire, currently has 34 members and has recently acquired some surplus gear from another UK amateur.

[Raleigh Amateur Radio Society](#), located in Raleigh, NC, USA, is one of the larger U.S. clubs and holds one of the nation's largest "Hamfests" each Spring. It also holds licensing and training sessions and has a significant public service component.

GORP low-power club was formed in 1974 by Rev. George Dobbs G3RJV (SK). It is a non-profit organisation run entirely by volunteers to promote **Low Power Radio (QRP)**. Whether you have a ham license or not - everyone is welcome. The quarterly magazine **SPRAT** provides a fascinating read containing articles of varying complexity, from simple test equipment, to fully functioning radio transmitters and receivers. You can access SPRAT from the GORP website and the annual cost of membership is very inexpensive. [GORP also has a YouTube Channel at this link.](#)

[Four States QRP club](#) has ideas and features focused on QRP operations and construction.

[The Michigan QRP club](#) has a simple DC Receiver kit which might still be available.

(Let's get your club listed here - send the information to Frank at w4nnp@gmail.com!)

Tidbits and Odds and Ends:

* William R. Hepburn runs the [**DX Info Centre Tropospheric Ducting Forecast**](#) website which provides six-day tropospheric ducting information and forecasting for those interested in exploring VHF, UHF and Microwave DX through the use of these ducting channels. These have the necessary

atmospheric conditions to produce tropospheric bending of the waves, which extends the range of stations well beyond normal limits. Frank experienced some of this while living in Saudi Arabia and receiving FM stations from Israel for periods of a few hours, and also once receiving a New York TV station while living in Florida.

[The KD6RE website has been added to the left column of our website's Resources page.](#)

**The Next section is a more-or-less “standard” section of the newsletter
which we hope to repeat repeat in each issue:**

- * [AM Broadcast Coverage Night Patterns, for U.S. and Canadian MW stations](#) (created by NF8M). Pick any MW frequency and see the typical coverage areas. A unique service!
- * **Antenna Headings:** VU2NSB provides a handy tool to show compass bearings to “everywhere” once your Maidenhead grid square is entered. [Here is the link to that website and service.](#)
- * **QRPpppp and WSPR allows you to check your antenna's** multi-band transmitting and receiving performance. This article by N2YCH discusses this using available software and common techniques.
- * **Searching for a Net?** This website by K4HCK helps you to find one in the locality you choose.
- * **Andy's (KB1OIQ) Ham Radio Linux Distribution** seeks to gather many ham apps compatible with Linux into one location. This video explains what he has done and continues to do.

Go to this web page to see Hot Iron's list of known Ham Clubs, Ham Radio Publications and YouTube Channels. Please let us know of additional ones!

Check out the various sections of www.w4nnpn.org, the website where the *Hot Iron* newsletters are hosted. There is much more there! Another rabbit hole.

Disclaimer: We have no ties with any commercial company mentioned in Hot Iron editions or on the w4nnpn.net website.

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